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Butt Fusion Integrity & NDE Evaluation

4th Quarterly Report

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Public Page

This project started on July 15 2007.

The primary objective of the program is to develop a tightly controlled butt heat fusion process through comprehensive testing and evaluation using novel test methods which will help to validate the safe and long term performance of PE joints under actual field conditions and serve as the basis for an effective reference point for the continued development of advanced Non-Destructive Evaluation (NDE) technologies. Specifically, this program aims to develop comprehensive analytical models to characterize the impact of various types of in-service stress states and fusion process variables; develop comprehensive test data to characterize the long term performance of joints made under parametrically controlled set of fusion variables; develop a set of criterion to identify "suspect joints" – joints that are visually acceptable but fail prior to their intended design life – which can be used as the basis for process improvements and continued technology developments; and integrate novel test methods and fusion parameters within applicable industry standards and specifications (ASTM, PPI, 49CFR Part 192).

Project Tasks and Status:

Task #1: Industry Steering Committee Interactions (Ongoing)
NYSEARCH/TEJ continue to is lead a joint industry steering committee consisting of members from each of the respective stakeholders including gas utility companies, regulatory agencies, and pipe/fitting and equipment manufacturers. This is to ensure an objective review of the data/information that is being developed and to obtain support of gas industry of any potential improvements/changes to Butt Fusion Procedures that will be recommended as a result of the project.

During January 31, 2008, a Steering Committee Meeting was held in order to develop a consensus position with respect to the overall test matrix and review the technical analytical modeling results to date and make recommendations related to the overall technical approach and short term testing requirements. A meeting is scheduled for August 19 and 20, 2008 to present analytical model findings to date, preliminary results/comparisons of short term tests (Tensile and McSnapper) and to develop a consensus with respect to the details of a Long Term/Performance Test Plan.

- **Next steering committee meeting scheduled for 08/19/08**

Task #2: Development of an Analytical Model

Given the numerous Butt Fusion variables and parameters that need to be considered, a purely empirical approach would be extremely cost prohibitive and too time consuming. Therefore analytical models are being applied to help develop and characterize the influence of key heat fusion process variables as a function of different pipe sizes and SDR values. All variables have been input into and preliminary results have reviewed. The next step in the process is to validate the model based on empirical test results, which are now in progress.

Task #3: Comprehensive Long Term Testing

TEJ has initiated a comprehensive review of several techniques to characterize the long term performance of butt heat fusion joints. It is anticipated that a consensus based approach with respect to the long term testing will be developed at the next scheduled Steering Committee meeting. The selection of the appropriate litmus test is required in terms of developing a suitable protocol to verify/validate the long term performance of PE joints under anticipated service conditions.

Task #4: Integration within Industry Standards

- Status: Not Initiated

Task #5: NDE Evaluation

- Status: Not Initiated

Task #6: Reporting

- Status: On-going